SYNTAX

SERVING TIMEX-SINCLAIR PERSONAL COMPUTERS

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IN THIS ISSUE

ZX/TS SUBSET OF 2068 PINS

Aligned with the slot, you will find the pins correspond exactly to the ZX/TS pinout with three exceptions. RAM CS, ROM CS, and 9V are missing and the corresponding pins are empty. Pins outside the ZX/TS connector span perform 2068 functions--GND appears on 4 more pins (30 & 32, top & bottom) and +15V on pin 3. The lack of 9V may be the only barrier to using ZX printers.

SPECTRUM MACHINE CODE ON 2068

Some Spectrum MC tapes will run on your 2068, The Fruit Machine, for example. Your chances are better if the program is written for 48K. Programs that call keyboard scan routines--as IN 64510, 61438, 32766, or 65278--will run if you change these to INKEY$ or STICK commands on your 2068. Also programs written with MC above RAMTOP are more likely to run. Because Spectrum program memory starts lower than in the 2068, the tape tries to load where the 2068 cannot accept it.

NEW TIMEX CONFIGURATION

OUT(ROSS): IN(X): NEW: GOTO start: seems to be the BASIC command line issued by Timex' visionary chairman, T. Fred Olsen. As the UK press report Sinclair's disappointment with results in the US market and a giant new deal with China, the Waterbubble Works is getting the message: patience is a limited virtue.

TIMEX-SINCLAIR USER RESTRUCTURING

Organization of ECC's North American magazine will be restructured, according to observers close to the scene, but no decision has been taken to stop printing. Changes will delay issue 8, for which ECC apologizes.

HAPPY HOLIDAYS TO OUR READERS FROM SYNTAX

E-Z LOADER SOFTWARE BUG FIX

Repair your E-Z Loader by just doing these simple steps:

- LOAD E-Z LOADER
- STOP the program (press shift A, NL)
- POKE 16609,0
- POKE 16610,0
- POKE 16611,0
- POKE 16612,0
- EDIT line 2, changing inverse R to normal R.
- SAVE the program using GOTO 2

Now when you reload and execute the program, it works properly.

This fix eliminates the double occurrence of 80 hex at the end of the variables area by substituting NOPs for the erroneous E-Z LOADER code at locations 16609-12.

Ed Gidley, APO NY

SPEED VU-CALC KEYING

As written, VU-CALC delays 0.5 seconds after each keypress. This fix eliminates the delay and simply checks to see if you released the key. If you hold the key more than 0.5 second, it repeats.

```
POKE 17458,6        POKE 17464,193
POKE 17459,150      POKE 17465,44
POKE 17460,197      POKE 17466,200
POKE 17461,205      POKE 17467,16
POKE 17462,187      POKE 17468,247
POKE 17463,2        POKE 17469,201
```

Greg Pfountz, Roanoke, VA

NEW PRODUCTS AND SERVICES

TAG Software offers 5 educational programs written in ZX/TS BASIC. For children and young adults, the packages reveal details of program structure. Topics include math, geography, and science. Call 203/723-2479 or write TAG Software, POB 688, Naugatuck, CT 06770.

WORD SINC II+, ZX/TS software word processor provides 42-character printout on ZX or TS2040 printers. Functions include: right-justify, search, replace, delete, move, insert, expand print, select page length, number pages. Provides full character set & punctuation, can use 16-48K memory, auto-repeat keys, and fast keyscan. Embeds control codes in text and uses 32-character, upper-case-only screen. $20 PPD from Gesang Associates, POB 452, Randallstown, MD 21133.

Intercontroller gives you 4 110V outlets individually controlled by your ZX/TS using BASIC ($99.95). Requires Softbox expansion port, ($59.95) which provides 4 software-selected slots for intercontrollers or other accessories, powers your computer, and contains an extra peripheral port. Needs a flexible ribbon connector ($17.95). Phone orders 617/738-5310, or write to Intercomputer, Inc., 358 Chestnut Hill Ave., Boston, MA 02146.

PAYOFF & PAYOUT, two personal money management programs, analyze your credit costs and spending patterns. PAYOFF accepts 12 charge accounts, which may have two interest rates per account, and shows balances, time to payoff, finance charges, and monthly payments. PAYOUT uses named expense categories to record and compare your quarterly spending patterns. Both print details and summaries, and require 16K. $12.95 PPD from ACE SOFTWARE, 2 East Oak Avenue, Moorestown, NJ 08057.

ZX/TS USERS' GROUPS

Memphis, TN: Memphis User Group, New contact person: Andy Boles, 3791 Barron Ave., Memphis, TN 38111 901/346-0890

Victoria, BC: Victoria Sync Assoc. Mr. Dee Schoolingin, Sec-Treas., 942 Cloverdale Ave., Victoria, BC, Canada, V8X 2T6

PRO/FILE Updates starts publishing in Dec.83--first issue tells how to make ZX PRO/FILE work with the CAI stringy floppy and how to preserve data when increasing memory. Four issues yearly, $9.95--devoted to support of ZX PRO/FILE. Order from Thomas B. Woods, POB 64, Jefferson, NH 03583. Tel: 603/586-7734.

Programmer's Utility EPROM for the Hunter NVM gives you 8 routines: renumber, copy (a block of BASIC), search for all occurrences of input string, delete blocks of lines, REM killer (by block), merge, free mem, & stop autorun program. One USR call takes you to menu and prompts. Relocates to any socket. $18.50 in US & Canada; $20 elsewhere, PPD. Delphic Enterprises, POB 72205, Corpus Christi, TX 78472.

HOT Z-II, revised, expanded to give assembly-language editor, labelling disassembler, single-step debugger. Checks syntax of Z80 mnemonic entry & relocates MC (including itself) can be put on EPROM. Cassette with 16 & 64K versions. Documentation (30pp+) explains how to customize. Current owners upgrade for $15.00. $24.95 + $2 P&H from Sinware, Box 8032, Santa Fe, NM 87504.

Computer Phone Book lists over 400 personal computer databases and explains how to access them. (Not all will be compatible with ZX/TS machines.) ISBN 0-452-25446-9, at bookstores, $9.95 US/$12.50 Canada

Pressure-sensitive thermal labels for TS2040, CAI P40, or Alphacom printer. Fan-folded in 1000s for $24.95. E. Arthur Brown Company, 1702 Oak Knoll Drive, Alexandria, MN 56308. 612/762-8847

Games for Your Timex-Sinclair 1000
Games for Your Timex-Sinclair 2000
From Dell, available at bookstores, each contains at least 20 games and several pages of hints for changing them. $5.95 US/$7.50 Canada

Sue Currier announces four programs for the 2068--available now. Zeus Assembler provides full-screen edit plus insert, delete, clear line and clear screen, auto line number with renumber, list, and search. Usable with printer. Personal Accountant includes 3 programs--bookkeeping, amortization, and address files. Bookkeeping does double-entry books from an entry of one amount and two account names. The reports section presents trial balance, expense accounts, assets and liabilities, and income and expense recap. Each can be printed. Amortization does payment or interest schedules and can print the results. Address files let you keep 3 lines of 40 characters for name and address as well as 2 40-charadter note lines.

Gulpman provides 15 mazes and 9 levels of play in X-man format with sound and graphics. This one can use joysticks.

If you yell in the Cyberzone, the lasers fire! You use your tape recorder as an amplifier to achieve voice control in this game, which is also joystick-compatible.

Expect 2-3 more releases--one will be a Monitor-disassembler--in about a month. Softsync, Inc., 14 E. 34th St., NY, NY 10016. 212/685-2080

Five ZX/TS releases include Casino Keno uses 80-number board, displays payoff on demand ($17.95). Money Management balances checkbook without duplicating check register ($12.95). Loan Finance calculates installment payments for both fully amortized and credit card loans ($14.95). Bond Yields accounts for coupon income and capital gains to output taxable income, current and maturity yields ($10.95). Bond Yields with T-Bill Bond Equivalent Yields includes all bond functions plus converting T-Bill quoted rates to bond equivalents ($14.95). Add $2 P&H for each cassette. MACSHAK SOFTWARE, 73-312 Ironwood Street, Palm Desert, CA 92260.

HIGH LINE NUMBERS

Did you know your machine does not limit you to 9999 BASIC lines?

If you attach enough memory, you can create up to 16383 lines. The system won't edit lines with statement numbers greater than 9999, but you can create higher numbered lines by POKEing the line numbers into the BASIC line.

Your computer executes and lists these lines. The line after 9999 appears as A000; the highest line, 16383, as G383. GOTOs and GOSUBs to high lines work fine. (Use the decimal form in GOTOs and GOSUBs--KO.)

Since you must POKE the line number, to most easily generate a high line, enter it as the lowest line in your program, then POKE the high byte, always located at 16509 for the first line.

Enter the following lines to see how it works:

```
 255 PRINT "TOP"
POKE 16509,63
 254 PRINT "ALMOST"
POKE 16509,63
 253 PRINT "AT THE"
RUN
9999 GOTO 16383
RUN
```

Dave Wood, Lexington, MA

(Reprinted by permission from the Boston Computer Society Sinclair Timex newsletter.)

EDITORIAL

Act now--call 1-800/24-TIMEX to ask for customer product support.

- o Say what **you** want--software or hardware manuals, connector pinouts or schematics, service or technical manuals, ROM source code--whatever.
- o Don't justify your request.
- o Leave your name and address.
- o Avoid threats of complaints to the FTC, Attorneys General, or Postal Officials--allow Timex the chance to consider its options.
- o Be brief, calm, and polite--KO.

BINGO CARD GENERATOR--8K/2K

One day we needed bingo cards in a hurry. This program arose out of necessity to generate regulation bingo cards.

Non-bingo players may find the quick way it generates random numbers interesting. I set up the numbers I want the computer to select from in variable X$. The computer takes random slices from the string to get the random sequence, assuring non-repeating numbers. I find this method superior to conventional random number choosers that compare each number generated to all those that came before it.

I use the COPY command in the immediate mode to print the bingo card, but you can add 135 COPY for automatic printing.

Frank Terranella, Sloatsburg, NY

```
  10 DIM A$(15,2)
  20 PRINT " B     I     N     G
   O"
  30 PRINT AT 9,15;"FREE"
  40 LET X$="0102030405060708091
011121314 15"
  50 GOSUB 150
  60 LET X$="1617181920212223242
526272829 30"
  70 GOSUB 150
  80 LET X$="3132333435363738394
041424344 45"
  90 GOSUB 150
 100 LET X$="4647484950515253545
855575859 60"
 110 GOSUB 150
 120 LET X$="6162636465666768697
071727374 75"
 130 GOSUB 150
 140 STOP
 150 FOR X=1 TO 5
 160 LET R=(INT (RND*(16-X))+1)*
2-1
 170 IF LEN X$=2 THEN LET A$(X)=
X$
 180 IF LEN X$=2 THEN GOTO 210
 190 LET A$(X)=X$(R TO R+1)
 200 LET X$=X$( TO R-1)+X$(R+2 T
O )
 210 IF VAL A$(X,1)=0 THEN LET A
$(X)=A$(X,2)
 220 LET C=(1 AND X$(1)="0")+(8
AND X$(1)="1")+(15 AND X$(1)="3"
)+(22 AND X$(1)="4")+(29 AND X$(
1)="6")
 230 IF C=15 AND X=3 THEN GOTO 2
50
 240 PRINT AT 3*X,C;A$(X)
 250 NEXT X
 260 RETURN
SYNTACTIC SUM:  41970, 8K ROM
```

SYNTAX HAS ARRANGED THE FOLLOWING HOLIDAY PROMOTION WITH MINDWARE INC. ! !

* PRICES NEVER AGAIN TO BE REPEATED *

THE MW-100 PLAIN PAPER PRINTER THOUSANDS SOLD AT $119.95 - SPECIAL CLOSE-OUT

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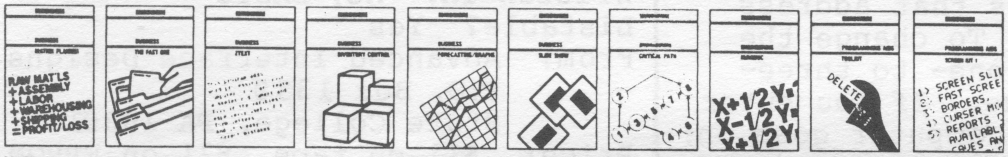

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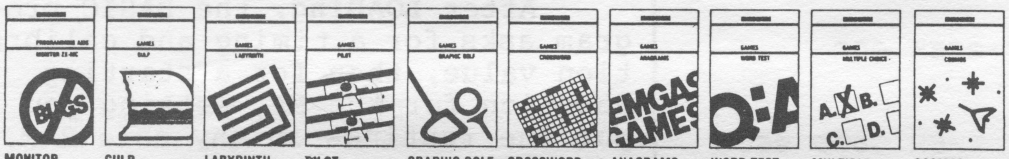
GAME SOFTWARE SPECIAL :

Choose any combination of three from the following nine programs - Retail Value up to $51.85



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EXAMINING MACHINE CODE--8K/1K

When working with machine code in USR routines, you need a convenient way to check and edit it. Add this program to the end of another program with MC subroutines. It lets you easily look at any address in memory, leave it alone or change its contents, and automatically go to the next address. On request it returns to the previous address.

Because the routine uses INKEY$ for data entry, run it in SLOW. This method also lets it interpret each character as typed instead of waiting for ENTER.

Give the program a starting address. It prints that address and its contents. To change the contents, enter a one- to three-digit decimal value. If you enter three digits, the computer goes on; if fewer, press ENTER to continue. Leave the contents unchanged by pressing ENTER. Go back to the previous address by pressing /. I find the / character convenient on my keyboard, but you can change line 9565 to check for a more convenient key.

Stop the program anytime by pressing BREAK. You can then run it again with another address.

```
9500 PRINT "ADDRESS"
9510 INPUT ADR
9515 SCROLL
9520 PRINT ADR;" ";PEEK ADR;"
";
9525 LET NEW=0
9530 FOR I=1 TO 3
9535 IF INKEY$<>"" THEN GOTO 953
5
9536 IF INKEY$="" THEN GOTO 9536
9540 LET X$=INKEY$
9550 IF X$=CHR$ 118 AND I=1 THEN
 GOTO 9510
9560 IF X$=CHR$ 118 THEN GOTO 96
00
9565 IF X$="/" THEN GOTO 9640
9566 PRINT X$;
9570 LET NEW=NEW*10+VAL X$
9580 NEXT I
9600 POKE ADR,NEW
9610 SCROLL
9620 LET ADR=ADR+1
9630 GOTO 9520
9640 SCROLL
9650 LET ADR=ADR-1
9660 GOTO 9520
SYNTACTIC SUM:  25094, 8K ROM
```

If you prefer to enter and see data as two-digit hex numbers, substitute the following lines:

```
9520 PRINT ADR;" ";CHR$ (INT ((P
EEK ADR)/16+28));CHR$ ((PEEK ADR
)-16*INT ((PEEK ADR)/16)+28);" -
 ";
9530 FOR I=1 TO 2
9570 LET NEW=NEW*16+CODE X$-28
NEW SYNTACTIC SUM:  29259
```

Nels Anderson, Framingham, MA

SOFTWARE REVIEW

Program: ZXLR8 Fast SAVE/LOAD System
Type: Utility
ROM/RAM: 8K/16K
Written in: MC, BASIC
Listable? Yes
From: Advanced Interface Designs
P.O. Box 1350
State College, PA 16801
Price: $11 on tape, $21 on EPROM

ZXLR8, a versatile and reliable fast SAVE/LOAD cassette storage system, not only quickly SAVEs programs, but also arrays, graphics and binary data (machine code). In addition, you get tape indexing and error checking routines. In all, you get 11 tape system commands plus a calibration program to find the best baud rate for your particular system.

After LOADing, the BASIC program asks for a timing and calibration value, then for a starting location for the MC, letting you put the routines in any safe RAM. After transferring the MC to the specified address, the computer erases the BASIC program and clears the workspace.

ZXLR8's excellent manual gives you 22 pages of thorough, lucid documentation.

I encountered only one problem with the system: a bad copy on side one of the cassette. Side two LOADed relatively easily.

I recommend ZXLR8--at only $11 for the tape, it's a bargain.

Len Harmon, Metairie, LA

HARDWARE REVIEW

Product: Joystick Adaptor
For: Any size system
From: Zebra Systems
78-06 Jamaica Ave.
Woodhaven, NY 11421
212/296-2385
Price: $19.95 + P&H

Zebra's plug-in joystick adaptor, a small (1.5"x5"x0.5") module, lets you attach an Atari-style joystick to your ZX/TS. The unit plugs onto the rear edge connector and provides another standard ZX/TS connector on its backside for other peripherals. The traces run straight through without buffers. A standard 9-pin socket (D9S) extends from the unit's left side to connect your joystick.

Zebra wired the unit as a direct-connected input port addressable by any I/O READ request for addresses below port 32 decimal (20 HEX). That is, when A5, A6, & A7, as well as IOREQ and RD go LOW, the port is selected. A single IC on the small PC board performs decoding and selection. Zebra scraped off the ID numbers of this lone IC, but a quick check of the required decoding makes the identification of the chip's logic fairly simple.

I found both the electronic design and physical construction very basic. The unit attaches directly (though Zebra provides protection diodes) to the D'n lines to indicate which internal switches on the joystick are closed. The port is thus neither buffered nor uniquely addressed and this could cause problems if you use other IO mapped peripherals at the same time. Zebra says they didn't know of any potential conflicts in port numbers when they designed the adaptor. If any show up they will advise potential users.

Construction looks like "home workshop" type, with some messy solder blobs, short insulation and other minor construction flaws.

Four pages of documentation come with the unit. Although they contain a few typos, the booklet does a good job of explaining the unit's capabilities. On the negative side, it provides no schematic and does not mention the partial decoding of the port number.

You must address the unit with a USR call, which non-machine code programmers could find a bother. Also, while you can return to BASIC with the "value" of the activated joystick (with 8 axes), the speed with which BASIC can sort out your response is just too slow for any kind of real arcade action. Zebra will respond to the problem of applying their joysticks to existing software by publishing a list of program "patches" to modify your software to use the adaptor. They advised me that patches now exist for Flight Simulator, Dragons, Mazogs and 3-D Monster Maze.

Despite these few negatives, I find the unit worth $20.00. You get fair value for your money, even as just a joystick port. I find other potential uses more exciting: cursor control for the handicapped, connection to a $20.00 light pen and an inexpensive 5-line input device for use in security and monitoring applications.

Paul Donnelly, Centreport, NY

CASSETTE LABEL MAKER--8K/16K

This program lets you design a three-line label on the screen with all characters available, then just hit "C" to copy as many labels as needed on the printer.

Once printed, you need only a pair of scissors and a little glue for really professionally labeled cassettes.

Lee E. Gayman, Mechanicsburg, PA

E. Arthur Brown now offers thermal mailing labels for the 2040, $24.95 for 1000 (New Products this issue).

In testing this program, we found you can edit, rather than re-enter, when the messages of lines 620 or 640 appear. Do this:

- Move the cursor right
- Key: '+"1st"+xx$(aTOb)+"2nd"'
- Press ENTER (or NEWLINE)

where 1st and 2nd stand for any string you want to add in those positions. Replace xx with X for the first line, Y for the second, or Z for the third. Use your choice of positions for a and b to slice the string you want to edit.

Hit BREAK to exit.--KO

```
 10 REM CASSETTE LABEL PROGRAM
 20 REM
 30 REM    BY L. GAYMAN 9/12/83
 40 REM       MECHANICSBURG, PA.
 50 REM
 60 LET X$="  "
 70 LET Y$="  "
 80 LET Z$="  "
 90 PRINT "     CASSETTE LABEL
PROGRAM     "
 100 PRINT ,,"USE WITH PRINTER T
O MAKE LABELS."
 110 PRINT ,,"YOU MAY MAKE 3 LIN
ES, EACH","LIMITED TO 30 CHARACT
ERS. ENTER","ONE LINE AT A TIME,
 FOLLOWED BY","N/L."
 120 PRINT AT 20,0;"NOW ENTER LI
NE 1:"
 130 PRINT AT 10,0;"
                    "
 140 FOR I=1 TO 3
 150 PRINT "  ";TAB 31;"  "
 160 NEXT I
 170 PRINT "
          "
 180 INPUT A$
 190 IF A$>"" THEN LET X$=A$
 200 IF A$="" THEN GOTO 270
 210 IF LEN A$>30 THEN GOSUB 620
 220 IF LEN A$>30 THEN GOTO 180
 230 PRINT AT 11,1;"
                    "
 240 PRINT AT 11,1;A$
 250 GOSUB 640
 260 GOTO 180
 270 PRINT AT 20,0;"NEXT, PLEASE
 ENTER LINE 2:      "
 280 INPUT B$
 290 IF B$>"" THEN LET Y$=B$
 300 IF B$="" THEN GOTO 370
 310 IF LEN B$>30 THEN GOSUB 620
 320 IF LEN B$>30 THEN GOTO 280
 330 PRINT AT 12,1;"
                    "
 340 PRINT AT 12,1;B$
 350 GOSUB 640
 360 GOTO 280
 370 PRINT AT 20,0;"NOW ENTER YO
UR LAST LINE:      "
 380 INPUT C$
 390 IF C$>"" THEN LET Z$=C$
 400 IF C$="" THEN GOTO 470
 410 IF LEN C$>30 THEN GOSUB 620
 420 IF LEN C$>30 THEN GOTO 380
 430 PRINT AT 13,1;"
                    "
 440 PRINT AT 13,1;C$
 450 GOSUB 640
 460 GOTO 380
 470 PRINT AT 20,0;"  "C" FOR COP
Y,"N" FOR NEW LABEL  "
 480 PAUSE 4E4
 490 LET D$=INKEY$
 500 IF D$="N" THEN CLS
 510 IF D$="N" THEN RUN
 520 IF D$="" THEN GOTO 480
 530 LPRINT "
                                 
                                 "
 540 LPRINT "  ";X$;TAB 31;"  "
 550 LPRINT "  ";Y$;TAB 31;"  "
 560 LPRINT "  ";Z$;TAB 31;"  "
 570 LPRINT "
                                 "
 580 FOR I=1 TO 3
 590 LPRINT
 600 NEXT I
 610 GOTO 470
 620 PRINT AT 20,0;"TOO MANY LET
TERS,PLEASE RE-ENTER"
 630 RETURN
 640 PRINT AT 20,0;"  PRESS N/L I
F O.K. (OR RE-ENTER)"
 650 RETURN
9998 SAVE "L"
9999 RUN
SYNTACTIC SUM:  48019, 8K ROM
```

8K ROMCALLS--8K/16K

Why reinvent the wheel? Sinclair put useful machine code routines in its 8K ROM. Some of us use these routines to great advantage by CALLing them from machine code. You might like to know the ROM contains 295 unconditional and 27 conditional CALLs, what address calls them, and where they reside.

This program first scans the ROM up to 7679, building a stack of CALLED and CALLING addresses. Then it sorts and displays them. Since it does lots of work, the first two phases take about 20 minutes. The printing procedure follows.

You can see the calls in lines 120-140. All Z80 conditional calls use decimal codes of 196 or greater at intervals of 8. Line 140 checks for these, sending all other codes through. Since no call uses values below 196, line 120 shunts lower values around the loop. Code 205 means an unconditional call; line

130 sends this address directly to the call processing routine.

Calls for the Z80 processor:

Value	Call
196	NZ,NN
204	Z,NN
205	NN
212	NC,NN
220	C,NN
228	PO,NN
236	PE,NN
244	P,NN
252	M,NN

Run the program once, SAVE it. Then GOTO 1000 to review the list (do not RUN). GOTO 2000 LPRINTs the entire list of 322 addresses.

Martin H. Irons, Goshen, NY

```
    1 REM THIS PROGRAM LISTS ALL
CALLS IN 8K OF ROM.
    2 REM BY MARTY IRONS, K2MI,
              48 MAGIC CIRCLE DR.,
              GOSHEN, NY 10924
    3 REM     5 MAY 1982
    4 REM     THIS PROGRAM TAKES
ABOUT 20 MINUTES TO SCAN THE ROM
SORT AND START TO PRINT
    5 REM     "GOTO 1000" TO LIST
ALL CALLS, AFTER RUNNING IT AND
SAVING IT.
    6 REM MODIFIED BY SYNTAX DEC
83
   10 DIM C$(400,10)
   20 LET MAX=0
   30 FAST
  100 FOR I=0 TO 7679
  110 LET V=PEEK I
  120 IF V<196 THEN GOTO 290
  130 IF V=205 THEN GOTO 200
  140 IF V-8*(INT (V/8))<>4 THEN
GOTO 290
  200 REM TEST CALLED ADDRESS
  205 LET V=PEEK (I+1)+256*PEEK (
I+2)
  210 IF V>7679 THEN GOTO 290
  215 REM THIS IS A CALL
  220 LET MAX=MAX+1
  230 LET V$=STR$ (V)+(STR$ (I+10
0000))(2 TO 6)
  240 IF LEN V$>9 THEN GOTO 270
  250 LET V$="0"+V$
  260 GOTO 240
  270 LET C$(MAX)=V$
  280 LET I=I+2
  290 NEXT I
  300 PRINT "SORTING ";MAX;" ENTR
IES"
  302 PAUSE 100
  304 CLS
  310 FOR I=1 TO MAX-1
  320 LET P=I
  330 FOR J=I+1 TO MAX
  340 IF C$(J)<C$(P) THEN LET P=J
  350 NEXT J
  360 LET Z$=C$(P)
  370 LET C$(P)=C$(I)
  380 LET C$(I)=Z$
  390 NEXT I
  400 PRINT "SORT COMPLETE"
  410 PAUSE 100
  420 CLS
  430 GOTO 1000
  500 PRINT "CALLED ROUTINES IN R
OM"
  510 PRINT
  520 PRINT "CALLED ADDR","CALLIN
G ADDR"
  530 PRINT
  540 RETURN
1000 GOSUB 500
1010 FOR I=1 TO MAX
1020 IF PEEK 16442>3 THEN GOTO 1
070
1030 INPUT Z$
1040 CLS
1050 IF Z$<>"" THEN GOTO 9999
1060 GOSUB 500
1070 PRINT "    ";C$(I,1 TO 5),"
    ";C$(I,6 TO 10)
1080 NEXT I
1200 PRINT
1210 PRINT "   THERE ARE ";MAX;"
 CALLS"
1220 GOTO 9999
2000 REM IF YOU HAVE A PRINTER
         "GOTO 2000" TO PRINT
         ALL CALLS.
2010 LPRINT "CALLED ROUTINES IN
ROM"
2020 LPRINT
2030 LPRINT "CALLED ADDR","CALLI
NG ADDR"
2040 LPRINT
2050 FOR I=1 TO MAX
2060 LPRINT "    ";C$(I,1 TO 5),"
    ";C$(I,6 TO 10)
2070 NEXT I
9999 STOP
SYNTACTIC SUM:  20578, 8K ROM
```

EXAMINE THE ROUTINES IN CONTEXT: this program assumes every byte is instruction--not text or address. Our modifications to this program limit the addresses to those within the ROM and do not scan addresses above the last return in the ZX/TS or Spectrum ROMs. We also changed the formula for V$ to permit five-digit addresses.

SYNTAX translated this program with Firstloader (this issue) and found the following modifications needed:

LINE	CHANGE	CAUSE
10	DIM(800,10)	ROM SIZE
30	Delete, was FAST	MACH SPEC
100	...TO 14446	ROM SIZE
230	...STR$(V)+ (STR$(I+100000))(2TO6)	ROM SIZE
240	...>9...	ROM SIZE
1020	...23689...	MACH SPEC
1070	...TO 5...6 TO 10	ROM SIZE
2060	...TO 5...6 TO 10	ROM SIZE

Spectrum & 2068 use 23689 in 1020.

OHM'S ZXLAW---8K/16K

ZXlaw calculates 4 functions of Ohm's law: Power (P) in Watts, Current (I) in Amps, Voltage (V) in Volts & Resistance (R) in Ohms.

RUN. Input known values as asked (0 if unknown). After you enter two non-zero values, your ZX/TS calculates the other two and displays all four. Press any key to continue--BREAK to stop.

Brad Hogg, Swan River, MB, Canada

Type in line 0 as line 1. Then POKE 16510,0. Continue as usual.--AZ

```
  0 REM OHMS ZXLAW (C) 1982
            BRAD HOGG
            BOX 1814
            SWAN RIVER, MB
            CANADA
            R0L 1Z0
  1 SAVE "OHM"
  2 SLOW
 10 CLS
 20 LET V=0
 30 LET I=0
 40 LET R=0
 50 LET P=0
 60 LET C=3
 70 PRINT "            OHMS LAW
          INPUT KNOWN VALUES
V,I,R,P       (0 IF UNKNOWN)"
 80 PRINT AT C,0;"VOLTAGE     (V
)=";
 90 INPUT V
100 IF V THEN LET C=C+1
110 PRINT V;" V"
120 PRINT AT C,0;"
                 "
130 PRINT AT C,0;"CURRENT     (I
)=";
140 INPUT I
150 IF I THEN LET C=C+1
160 PRINT I;" A"
170 IF V AND I THEN GOTO 290
180 PRINT AT C,0;"
                 "
190 PRINT AT C,0;"RESISTANCE (R
)=";
200 INPUT R
210 IF R THEN LET C=C+1
220 PRINT R;" OHMS"
230 IF V AND R OR I AND R THEN
GOTO 290
240 PRINT AT C,0;"
                 "
250 PRINT AT C,0;"POWER       (P
)=";
260 INPUT P
265 PRINT P;" W"
270 IF P THEN LET C=C+1
280 IF NOT V OR NOT I THEN GOTO
320
300 PRINT "POWER       (P)=";V*I
;" W"
310 PRINT "RESISTANCE (R)=";V/I
;" OHMS"
320 IF NOT P OR NOT R THEN GOTO
350
330 PRINT "CURRENT     (I)=";SQR
(P/R);" A"
340 PRINT "VOLTAGE     (V)=";SQR
(P*R);" V"
350 IF NOT P OR NOT I THEN GOTO
380
360 PRINT "VOLTAGE     (V)=";P/I
;" V"
370 PRINT "RESISTANCE (R)=";P/(
I**2);" OHMS"
380 IF NOT R OR NOT V THEN GOTO
410
390 PRINT "POWER       (P)=";(V**
2)*R;" W"
400 PRINT "CURRENT     (I)=";V/R
;" A"
410 IF NOT I OR NOT R THEN GOTO
440
420 PRINT "POWER       (P)=";(I*
*2)*R;" W"
430 PRINT "VOLTAGE     (V)=";I*R
;" V"
440 IF NOT V OR NOT P THEN GOTO
470
450 PRINT "RESISTANCE (R)=";(V*
*2)/P;" OHMS"
460 PRINT "CURRENT     (I)=";P/V
;" A"
470 PRINT AT 21,0;"PRESS ANY KE
Y TO CONTINUE"
490 IF INKEY$="" THEN GOTO 490
500 RUN 2
SYNTACTIC SUM:  8596, 8K ROM
```

BOOK REVIEW

Title: Graphics: A to Z
Author: Paul Bingham, Rick Goulian
From: PleasanTrees Programming
7760 N. Hopdown
Tucson, AZ 85741
Price: $17.95 ppd., 190 pgs.

This tutorial manual starts at crude BASIC PRINT statement graphics and goes to machine code graphic subroutines. It assumes reasonable familiarity with ZX/TS BASIC. It begins with a slow but not tedious explanation of basic graphic PRINTing and PLOTting and rapidly builds to a MC subroutine blitz.

Starting chapters give programs and explanations to draw Ernie of Sesame St. and mathematical designs (17 examples), print big characters, perform Etch-a-Sketch functions plus horizontal and vertical bar graphing. Chapter 3 covers the screen format, POKEing for faster action, scrolling, and

begins Z80 MC routines with a neat block transfer operation.

Chapter 4, Animation, starts the action, explaining elementary blending technique--printing one character over another in quick succession to simulate motion. The flip-book method covered next makes a main canvas in high memory that includes all your graphic elements, then bringing whole blocks of canvas onto the screen at once.

Chapter 5 separates the advanced second section, covering miscellaneous, interesting topics: sound generation (using an MC driver through the TV screen), resetting RAMTOP without losing variables, line numbers beyond 9999, line number 0 and an array of mistakes that cause spectacular crashes. This chapter also wastes a few pages discussing a compiler.

Perhaps the most powerful two chapters follow next, disecting Memotech's HRG (hi-res graphics) packages. The listing alone takes 23 pages and gives memory locations and codes for the HRG. This can help HRG owners understand their $99 unit and use it better. I doubt the unscrupulous will enter the code, transfer it to EPROM and cheat Memotech of well deserved income--it takes about 7,000 keystrokes just to enter the code.

Finally, chapters 8 and 9 deal with MC in REM statements, using the ROM print routines and advanced screen printing techniques with animation in MC. The final chapters look tacked on; MC listings given seem virtually undocumented.

I found a few typos in the book and though most programs contained REM lines, the accompanying text reasonably documented them. I felt a little short-changed by the last two chapters and would like to see them expanded.

Overall I consider Graphics: A to Z a fine treatment of the subject--an 8 on my 1-to-10 scale.

Paul Donnelly, Centreport, NY

DEAR EDITOR:

My problem is unusual--in fact "rare". I am one of an estimated 75-80,000 Americans with ataxias. These progressive, irreversible neuromuscular diseases weaken and uncoordinate motor and sensory impulses. In my case, while I can type at an apallingly slow rate, I can't load typewriter paper myself.

Since I have a mini-income, I hopefully tried a ZX80 from a 1981 magazine ad. Its operating system (ROM) quite nicely fits some of my special needs, so when 8K ROMS came out, I found a friend to install a dual-ROM switch and rewired Atari keyboard. I believe Uncle Clive's OS is by far the best for me.

Great! But without superior ease and convenience in I/O access, I simply cannot handle it at all. I have never SAVEd a line from it (although others have) and only once LOADed to it in 2 1/2 years! This is because I am unable to manually operate cassette recorders myself and lack speech to get help. With a better keyboard I can easily (though v-e-r-y slowly) program in Sinclair BASIC as well as Z80 MC, but it's lost when I can't SAVE it.

Now a TS-2068, with American-added user-ease, looks (in reviews) almost ideal for me, except for its automatic repeat. Like most of America's 800,000 neuromuscular disabilities (such as MD, MS, ALS, etc.) FA leaves me with too little dexterity to depress the keys lightly and quickly.

How can I program repeat out of TS-2068 as a completely user-transparent MC routine? How do I time it? Where in memory do I put it? I must know what to do beforehand, because I'll have to type my stuff for someone else to enter. No room for hit-or-miss trial on this first one!

Roger Keffer, President
Friedrich's Ataxia Group in America
Kansas Chapter Lawrence, KS

Timex 2068 and Spectrum provide the ability to change both initial and repeat interval of keys using POKES to system variables. You may set a delay of 4.25 seconds (255/60) by POKEing 23561,255 (first delay) and 23562,255 (subsequent delays). If those don't suffice, I suggest an MC routine to reset those registers frequently or a substitute keyboard scan routine. Readers with other solutions can write to us--KO.

Some comments for readers who use Programmers Toolkit 16K by Softsync--don't REM out any lines containing GOTO or GOSUB statements when using the RENUMBER routine. The renumber routine works very well but will not renumber a GOTO or GOSUB if the number that follows does not exist as a line number.

Toolkit instructions don't say so clearly, but you can renumber from any line, not just up to 511.

To use FILL and REVERSE, lift them out of Toolkit and save them as separate line 1 REM statements for use in other programs. FILL uses 19 bytes starting at 32265; REVERSE, 20 bytes at 32284. Use a standard relocation routine.

On my menu-driven programs, I find, since the menu starts at line numbers unique to each program, it helps to reserve variable G for the menu start line number. Then you can find the menu start line and run the program from that line with GOTO G--two touches of the G key.

R.H. Mitchell, Willowdale, Ontario

What transistor replaces the ZTX-750 or ZTX-752 in the power converter that makes +12V & -5V for the memory chips in the Sinclair or Timex/Sinclair 16K RAM pack?

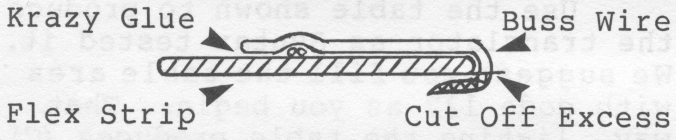
J.L. Peeler,Costa Rica

As Syntax reported in May 82, use a TIP34A to replace this transistor. Complete collections of back issues are available--see p.23--KO

Here's my solution to repair traces on the flexible strip that goes between the keyboard and the circuit board.

Bond a piece of 30 AWG buss wire to the bad trace with a drop of "Krazy Glue." Then fold the end over the end of the strip and cut off the excess.

Ray Moore, San Jose, CA



. . . . .

On page 12, Vol 4 No 10, Oct 83 you recommend a 9 VDC source good for 650 mA. What kind of setup do you use to measure this?

Frank Kolar, Fountain Hills, AZ

For those of you who need this kind of basic electronic information, I would recommend The Radio Amateur's Handbook, published by the American Radio Relay League--KO

I agree with Paul Donnelly's assessment of The Ins and Outs of the Timex TS1000 and ZX81--I found little new. Your readers may like Timex-Sinclair Interfacing by James M. Downey and Don Rindsberg ($10.95 from Prentice-Hall). A broader selection of projects are described in more detail than in Thomasson's book. Still, it's not perfect--there's nothing on PIO's, for instance. It's a good place to start and better value for money.

I purchased a 2068 from Sears, but I'm frustrated by the missing pinout for the two expansion ports. I haven't been able to get one from Timex, either. As a service to your readers could you print pinouts and a full schematic?

Does any body know if Memotech 32K RAM packs use the top 40 bytes of the 8 to 16K block of memory?

Paul W. Hunter, Okemos, MI

Call 1-800/24-TIMEX & tell 'em what **you** want--**ALL OF YOU**--we'll respond

---

After months of performing well, recently my ZX81 can't LOAD tapes. On the TV I get several seconds of black and white noise, then noise with broad black and white stripes. Now the screen goes white and after a second or two offers K. Hitting space before I get K doesn't affect the screen. I bought a better tape and entered, ran, and saved a 600-step program. Right after saving it, I loaded it okay. Trying to load it another day produced the same condition.

George F. Putnam, Florissant, MO

I have a ZX 81 with a 16K RAM module. While entering a program my TV screen went black. When I reset the computer all I could get was a clear screen with the K missing from the black square in the lower left corner of my screen. I pressed NEW and ENTER; my screen went black again. Unplugging the 16K module returned things to normal.

Charles Davis, Tompkinsville, KY

Noise makes the computer quit the LOAD and execute NEW. Black on the TV denotes positive signals at the EAR jack; white, no signal. Thus, white-flecked black bars mark drop-outs, black marks in white spaces mean noise spikes.

Test with short programs and find out if it goes with recorder, cassette, RAM or computer.

If only newly made tapes LOAD suspect a signal-to-noise ratio problem: a small signal buried in normal noise or a strong source of noise hiding normal signals. If the noise isn't on the signal at pin 20 of IC1, replace it.

Sounds like Charles' RAM has a problem on data line 7. When you only find this with with a RAM pack look for a bad RAM chip or edge-connector contact--KO.

FIRSTLOADER--FROM ZX/TS TO 2068

Syntax commissioned a custom program, written by David Ornstein, to convert your existing programs for the 2068 or 48K Spectrums.

This program translates input bytes from ZX/TS tapes to an equal number of output bytes in your 2068 that you must edit, and then save. Codes & program control structures differ in the two designs, making functionally identical programs use different numbers of bytes.

Create the program in two parts--the **translation table** shown here and the executable portion.

```
44000    32   130   129   131   136
44005   138   137   139   143   143
44010   143    34    96    36    58
44015    63    40    41    62    60
44020    61    43    45    42    47
44025    59    44    46    48    49
44030    50    51    52    53    54
44035    55    56    57    65    66
44040    67    68    69    70    71
44045    72    73    74    75    76
44050    77    78    79    80    81
44055    82    83    84    85    86
44060    87    88    89    90   165
44065   166   167    32    32    32
44070    32    32    32    32    32
44075    32    32    32    32    32
44080    32    32    32    32    32
44085    32    32    32    32    32
44090    32    32    32    32    32
44095    32    32    32    32    32
44100    32    32    32    32    32
44105    32    32    32    32    32
44110    32    32    32    32    32
44115    32    32    32    13    32
44120    32    32    32    32    32
44125    14    32    32   143   141
44130   142   140   135   133   134
44135   139   143   143   143    34
44140    96    36    58    63    40
44145    41    62    60    61    43
44150    45    42    47    59    44
44155    46    48    49    50    51
44160    52    53    54    55    56
44165    57    65    66    67    68
44170    69    70    71    72    73
44175    74    75    76    77    78
44180    79    80    81    82    83
44185    84    85    86    87    88
44190    89    90    32   172   173
44195    32   175   176   177   178
44200   179   180   181   182   183
44205   184   185   186   187   188
44210   189   190   192   193   194
44215   195    94   197   198   199
44220   200   201   203   204   205
44225   224   225   226    32    32
44230   230    32   232   233   234
44235   235   236   237   238   239
44240   240   241   242   243   244
44245   245   246   247   248   249
44250   250   251    32   253   254
44255   255
```

Direct tables, such as this, consist of an address, derived from the input code, containing an entry that equals a desired output code. Our table address consists of the CODE of the ZX/TS character +44000. Entries consist of 2068 codes to produce the character, command, or function. If no one corresponding code exists, we pick a substitute to hold the space. Then we edit the translated program as needed.

Use the table shown to produce the translator as Syntax tested it. We suggest you fill the table area with code 127 as you begin. That way, listing the table produces (C) symbols if you miss any entries.

You can modify the translation table to substitute any byte. Add 44000 to the ZX/TS character code, then POKE that address in your 2068 with the code you want the program to contain. Codes below 32 trigger errors in the display.

For example, say you want SLOW changed to REM. You take 228, the ZX/TS code for SLOW, add 44000, and POKE 44228,234--the 2068 REM code.

You can enter the executable code in whatever form you find convenient--we've provided both hex and decimal listings--but only the assembler listing is annotated.

Save the 2068 program using SAVE"FIRSTLOADR"CODE 44000,1250. Make several copies & VERIFY each.

To use the tape, CLEAR 43999, then LOAD"FIRSTLOADR"CODE (enter). When the 2068 displays 0 OK, 0:1 position your ZX/TS tape in the 5-second quiet spot. Activate the loader by typing RAND USR 45000, and observe the red and black stripes in the border area. Then start the ZX/TS tape and observe the stripes again as they change width, indicating ones and zeros in the incoming data.

You will need a lower volume setting than if you were loading to a ZX/TS from the same recorder. You may find a Winky board eases loading. In some cases a 0.2 uF capacitor in series with the center

conductor of the ear cord and a 1k resistor shunting the 2068 ear jack permits a wider range of volume settings for the ZX/TS tapes.

When the converter finds the end of the VARS area on the tape it switches from load to convert. At completion, your 2068 will display 0 OK, 0:1. LIST your proram and look for junk, If your translation looks OK, save it to a 2068 tape before you proceed. If the screen fills with garbage, or you get no listing, or LOADing of the ZX/TS tape stops early, type NEW, then try a different volume setting.

Edit the 2068 version to account for differences in comments and codes. Of course you can also add color functions to the 2068 program thus created.

Not all keywords translate sensibly--check your output list for the following:

Keyword	Action
CHR$	Change char code
CODE	Change compared value
FAST	Delete SpacE
PAUSE 0	Delete or use PAUSE 1
PEEK	Change address
PLOT	Reprogram
POKE	Change address, data
UNPLOT	Reprogram SpacE
USR	Change address
SCROLL	Delete SpacE or use PRINT
SLOW	Delete SpacE
Shift Q	Change SpacE to """

Also, the program removes all ZX/TS inverse characters, substituting normal characters, and translates the half-tone character graphics to solid blacks of the same shape.

After editing, save the latest updated and enhanced program for use with the 2068.

By modifying the translation table, you can substitute user-defined graphics as you convert.

You can purchase this program on tape for $19.95 ppd from E-Z Key, Suite 75-STX 711 Southern Artery, Quincy, MA 02169. Call 617/773-1187 to use VISA or MC.

This table shows addresses to POKE, in steps of five, with the values reading left-to-right for the 5 successive locations. POKE them manually or write a loop to advance the address automatically. These decimal codes correspond to the hexadecimal assembly listing on the following pages.

45000	205	60	176	205	222
45005	175	6	7	54	118
45010	35	16	251	205	89
45015	176	205	142	176	201
45020	207	3	33	9	192
45025	17	12	0	25	54
45030	254	167	237	82	205
45035	251	175	113	124	254
45040	0	40	233	205	75
45045	176	205	46	176	24
45050	239	14	1	6	0
45055	205	68	176	62	127
45060	219	254	31	48	49
45065	23	23	23	56	2
45070	24	239	213	30	148
45075	6	28	29	219	254
45080	23	23	203	123	123
45085	56	244	16	244	209
45090	32	4	254	86	48
45095	213	63	203	17	48
45100	208	201	35	235	42
45105	20	192	55	237	82
45110	235	208	193	201	207
45115	12	205	251	175	203
45120	121	40	249	201	120
45125	238	2	211	254	71
45130	201	17	21	192	122
45135	188	192	123	189	192
45140	126	198	128	119	201
45145	33	125	192	126	254
45150	118	200	205	101	176
45155	24	247	17	4	0
45160	25	62	127	219	254
45165	31	48	202	126	254
45170	126	32	8	54	14
45175	17	6	0	25	24
45180	236	229	17	224	171
45185	38	0	111	25	126
45190	225	119	35	254	13
45195	32	220	201	17	125
45200	192	167	237	82	68
45205	77	197	42	75	92
45210	43	237	91	83	92
45215	213	205	187	18	209
45220	237	83	83	92	193
45225	35	35	235	33	125
45230	192	237	176	201	

On the following pages you'll find FIRSTLOADER code, assembled to location 45000. This excludes the translation table. Read columns as follows: hex address, hex code for instruction, assembler line number (ignore it), assembler label (for human use), then a Z80 instruction mnemonic or assembler pseudo-operator, operand mnemonics, and a semicolon followed by comments.

```
AFC8             00100          ORG     45000
AFC8 CD3CB0      00110          CALL    FNAME
AFCB CDDEAF      00120          CALL    LOADER
AFCE 0607        00130          LD      B,7
AFD0 3676        00140 INCASE   LD      (HL),118; ZX/TS NL
AFD2 23          00150          INC     HL
AFD3 10FB        00160          DJNZ    INCASE
AFD5 CD59B0      00170          CALL    XLATE
AFD8 CD8EB0      00180          CALL    MAKPRG
AFDB C9          00190          RET
AFDC CF          00200 ERR3     RST     8
AFDD 03          00210          DEFB 3
C014             00220 E1LINE   EQU     49172; ZX/TS E-LINE + 32K
C015             00230 E2LINE   EQU     49173
AFDE 2109C0      00240 LOADER   LD      HL,49161; ZX/TS VERSN + 32K
AFE1 110C00      00250          LD      DE,12
AFE4 19          00260          ADD     HL,DE   ; SKIP 12 BYTES HL PT 49173
AFE5 36FE        00270          LD      (HL),00FEH; LOAD AT LEAST 256 BYTES
AFE7 A7          00280          AND     A
AFE8 ED52        00290          SBC     HL,DE
AFEA CDFBAF      00300 LL36     CALL    INBYTE  ; GET BYTE IN C
AFED 71          00310          LD      (HL),C  ; STORE THE ZX/TS BYTE
AFEE 7C          00320          LD      A,H
AFEF FE00        00330          CP      0
AFF1 28E9        00340          JR      Z,ERR3
AFF3 CD4BB0      00350          CALL    EFIX    ; IF HL=E2LINE ADD 128 TO HI
AFF6 CD2EB0      00360          CALL    ENDBYT  ; BYTE (IND HL).  LAST BYTE?
AFF9 18EF        00370          JR      LL36
AFFB 0E01        00380 INBYTE   LD      C,1
AFFD 0600        00390 LL3      LD      B,0
AFFF CD44B0      00400 LL32     CALL    BORDER  ; FLIP COLOR
B002 3E7F        00410          LD      A,007FH
B004 DBFE        00420          IN      A,(00FEH)
B006 1F          00430          RRA
B007 3031        00440          JR      NC,LL7  ; IF BREAK IS PRESSED
B009 17          00450          RLA
B00A 17          00460          RLA
B00B 17          00470          RLA
B00C 3802        00480          JR      C,LL38  ; IF HAVE A SIGNAL
B00E 18EF        00490          JR      LL32
B010 D5          00500 LL38     PUSH    DE
B011 1E94        00510          LD      E,148
B013 061A        00520 LL4      LD      B,26
B015 1D          00530 LL5      DEC     E
B016 DBFE        00540          IN      A,(00FEH)
B018 17          00550          RLA
B019 17          00560          RLA
B01A CB7B        00570          BIT     7,E
B01C 7B          00580          LD      A,E
B01D 38F4        00590          JR      C,LL4
B01F 10F4        00600          DJNZ    LL5
B021 D1          00610          POP     DE
B022 2004        00620          JR      NZ,LL6
B024 FE56        00630          CP      86
B026 30D5        00640          JR      NC,LL3
```

```
B028 3F        00650 LL6     CCF
B029 CB11      00660         RL      C
B02B 30D0      00670         JR      NC,LL3
B02D C9        00680         RET
B02E 23        00690 ENDBYT  INC     HL        ; WAS THAT THE LAST BYTE?
B02F EB        00700         EX      DE,HL
B030 2A14C0    00710         LD      HL,(E1LINE); IS HL PAST IND E1LINE?
B033 37        00720         SCF
B034 ED52      00730         SBC     HL,DE
B036 EB        00740         EX      DE,HL
B037 D0        00750         RET     NC
B038 C1        00760         POP     BC        ; GO BACK TO MAIN ROUTINE
B039 C9        00770         RET
B03A CF        00780 LL7     RST     8
B03B 0C        00790         DEFB 12
B03C CDFBAF    00800 FNAME   CALL    INBYTE    ; LOOK FOR 1ST INVERSE CHAR
B03F CB79      00810         BIT     7,C
B041 28F9      00820         JR      Z,FNAME; KEEP LOOKING
B043 C9        00830         RET               ; NOW START LOADING ZX CODE
B044 78        00840 BORDER  LD      A,B       ; FLIP BORDER COLOR 2 OR 0
B045 EE02      00850         XOR     2
B047 D3FE      00860         OUT     (00FEH),A
B049 47        00870         LD      B,A
B04A C9        00880         RET
B04B 1115C0    00890 EFIX    LD      DE,E2LINE; DID I JUST LOAD TO E2LINE
B04E 7A        00900         LD      A,D
B04F BC        00910         CP      H         ; COMPARE HI BYTE
B050 C0        00920         RET     NZ
B051 7B        00930         LD      A,E
B052 BD        00940         CP      L         ; COMPARE LO BYTE
B053 C0        00950         RET     NZ
B054 7E        00960         LD      A,(HL)
B055 C680      00970         ADD     A,128     ; ADD 32K
B057 77        00980         LD      (HL),A
B058 C9        00990         RET
B059 217DC0    01000 XLATE   LD      HL,49277; 1ST BYTE OF 1ST LINE #
B05C 7E        01010 LXL1    LD      A,(HL)    ;   AT 16509+32K
B05D FE76      01020         CP      118       ; IS IT 1ST NL IN ZX D-FILE
B05F C8        01030         RET     Z         ; IF SO, YOU'RE DONE
B060 CD65B0    01040         CALL    LINE
B063 18F7      01050         JR      LXL1
B065 110400    01060 LINE    LD      DE,4      ; SKIP LINE # & LENGTH
B068 19        01070         ADD     HL,DE
B069 3E7F      01080 LLIN1   LD      A,007FH ; TEST BREAK ON 2068
B06B DBFE      01090         IN      A,(00FEH); GET CHAR IN ACCUM
B06D 1F        01100         RRA
B06E 30CA      01110         JR      NC,LL7  ; EXIT IF BREAK PRESSED
B070 7E        01120         LD      A,(HL)  ; GET BYTE
B071 FE7E      01130         CP      126     ; CHECK FOR ZX/TS SLUG
B073 2008      01140         JR      NZ,LLIN2; GET CODE FROM TABLE
B075 360E      01150         LD      (HL),14 ; SUBST 2068 SLUG
B077 110600    01160         LD      DE,6    ; SKIP SLUG + 5 BYTES
B07A 19        01170         ADD     HL,DE
B07B 18EC      01180         JR      LLIN1   ; DO IT AGAIN
```

```
B07D E5        01190 LLIN2   PUSH    HL       ; STORE THE BYTE ADDRESS
B07E 11E0AB    01200         LD      DE,44000; TABLE START ADDRESS
B081 2600      01210         LD      H,0      ; PUT ZX/TS CHAR CODE IN HL
B083 6F        01220         LD      L,A
B084 19        01230         ADD     HL,DE    ; ADDRESS OF BYTE IN TABLE
B085 7E        01240         LD      A,(HL)   ; GET BYTE FROM TABLE TO A
B086 E1        01250         POP     HL       ; RECALL BYTE ADDRESS
B087 77        01260         LD      (HL),A   ; PUT NEW CODE IN OLD ADDRESS
B088 23        01270         INC     HL
B089 FE0D      01280         CP      13       ; CHECK FOR 2068 NL
B08B 20DC      01290         JR      NZ,LLIN1; NO, DO IT AGAIN
B08D C9        01300         RET              ; FINISHED THAT LINE
B08E 117DC0    01310 MAKPRG  LD      DE,49277; APPEND PROG TO 2068 CONTENT
B091 A7        01320         AND     A
B092 ED52      01330         SBC     HL,DE    ; HL PT 1ST BYTE OF D-FILE
B094 44        01340         LD      B,H      ; BC = NO. BYTES IN PROGRAM
B095 4D        01350         LD      C,L
B096 C5        01360         PUSH    BC       ; SAVE SIZE OF PROG
B097 2A4B5C    01370         LD      HL,(23627); ADDRESS OF 2068 VARS
B09A 2B        01380         DEC     HL
B09B ED5B535C  01390         LD      DE,(23635); ADDR OF 2068 BASIC PROG
B09F D5        01400         PUSH    DE       ; SAVE PROG SYSVAR
B0A0 CDBB12    01410         CALL    4795     ; CALL ROM INSERT-USE 5717 ON
B0A3 D1        01420         POP     DE       ; SPECT-RESTORE PROG SYSVAR
B0A4 ED53535C  01430         LD      (23635),DE
B0A8 C1        01440         POP     BC       ; BYTE COUNT OF PROG
B0A9 23        01450         INC     HL
B0AA 23        01460         INC     HL
B0AB EB        01470         EX      DE,HL    ; DE=DATA DESTINATION
B0AC 217DC0    01480         LD      HL,49277; START OF STUFF TO MOVE
B0AF EDB0      01490         LDIR             ; BLOCK MOVE
B0B1 C9        01500         RET
```

```
BORDER B044 00840   00400
E1LINE C014 00220   00710
E2LINE C015 00230   00890
EFIX   B04B 00890   00350
ENDBYT B02E 00690   00360
ERR3   AFDC 00200   00340
FNAME  B03C 00800   00110 00820
INBYTE AFFB 00380   00300 00800
INCASE AFD0 00140   00160
LINE   B065 01060   01040
LL3    AFFD 00390   00640 00670
LL32   AFFF 00400   00490
LL36   AFEA 00300   00370
LL38   B010 00500   00480
LL4    B013 00520   00590
LL5    B015 00530   00600
LL6    B028 00650   00620
LL7    B03A 00780   00440 01110
LLIN1  B069 01080   01180 01290
LLIN2  B07D 01190   01140
LOADER AFDE 00240   00120
LXL1   B05C 01010   01050
MAKPRG B08E 01310   00180
XLATE  B059 01000   00170
```

Only one change will make this program work with a 48K Spectrum as well. At B0A0H (45216 decimal), we call a ROM routine located at 4795 in the TS2068 and at 5717 in the Spectrum. These routines create an empty space, but you must fill it.

Most of this code is self-contained. Only the routine XLATE, located at 45145, passes a value to the code for MAKPRG. If you modify code, restore the value held in HL on return from address 45151 prior to calling MAKPRG.

SOFTWARE REVIEW

Program: Tax Return Helper
Type: Home/Business
ROM/RAM reqd: 8K/16K
Written in: BASIC
From: KSOFT Co.
845 Wellner Road
Naperville, IL 60540
(312) 961-1250
Price: $14 for TS1000,
$18 for TS2000

No matter who you are, once a year you must pay income taxes. Many find the job complicated enough to seek expert help. The most difficult aspect of preparation, it seems, lies not in knowing tax law, but in computing the figures and correlating entries on the forms. Often various forms or values use another specified value.

Suppose after you complete the form you find an error or an overlooked check stub. You may need to make ten changes on the return to correct the omission.

But Tax Return Helper can make preparing and correcting your income taxes simple and efficient.

This user-friendly program uses an automatic data transfer system that makes it work like an electronic spreadsheet, assuring smooth, accurate data correlation between forms.

Even after you enter data or complete the return, you can easily make corrections. Just enter the new figure on the appropriate line and the computer updates all lines that entry interacts with.

I tested five tax return programs. Only this version from KSOFT features this system, similar to those found in professional software packages selling from several hundred to $1000 or more.

With Tax Return Helper you can print the entire form or just copy the screen in a 32-character format, then transfer data to federal forms and save everything on tape.

Despite the functional ease of the software, it exhibits flaws. For example, I found three consistent spelling errors--annoying but they did not interfere with the program's performance.

Gabriela Abramovici, KSOFT president, assured me that her quality control department fixed the mistakes and future editions will arrive perfect.

In the entire package, the documentation falls short. The poorly written instructions need revision. Although the directions detract from the overall excellence of the package, its user-friendliness more than makes up for what the instructions lack.

Toward the end of my testing, the cursor developed an apparently benign quirk--it changed from its usual inverse space to the word PLOT, then after I entered data to ?LOT. This didn't seem to affect program operation and it returned to normal after the system correlated the affected lines.

As a result of consisting entirely of BASIC, the program handles interaction within the forms somewhat slowly. As a professional tax preparer, I find this limiting. I'd like a 64K machine code version to allow all the supplied forms to interact swiftly and interface to a full-size printer. For professional use, I would also like to see form 4972 or maybe Schedule G for income averaging.

All in all, KSOFT presents a superior package for home use. You can get the 1983 edition in January. The program provides Form 1040 and Schedules A, B, C, D and E. A short test program helps you set the proper loading volume.

As a professional courtesy, I remind you that no matter how you prepare you taxes, you are solely responsible for it and must prove your deductions if audited and pay any additional taxes or penalties.

Victor M. Font Jr., P.O. Box 1436,
Bayonne, NJ 07002-6436

MEMOTEXT SPECIFICS

Overall, I think Memotech produces a powerful word processing module. I would like to add these observations to the Memotext word processor review, just published in SYNTAX Sep.83:

Major Advantages:
1. Memotext totally redefines KB (keyboard) functions to operate as a typewriter--without shift, you type lower case letters, numbers, space and period. Shifted letters become upper case. You can't produce graphics. You can get other KB symbols such as <, " and ? using easy special commands and symbols not available on the KB such as !, # and @ with ASCII character hex code commands, if your printer recognizes them. Letters, numbers and DELETE repeat when you hold the key. You can type very fast.
2. When text contains syntax or command errors, the system displays clear, meaningful prompts before printing or saving.

Serious Disadvantages:
1. Deletes only single characters or erases the entire document--no words or lines.
2. Lacks a memory-remaining mode.

Minor Disadvantages:
1. Space key does not repeat.
2. Cursor moves only one character or line at a time.
3. Switching the unit off requires you to reset the computer to clear the screen.

Observations:
1. Right margin justification may fail by one or two characters. It also often puts extra space in poor locations, like between a paragraph number and the first word.
2. The manual lacks example text inputs and the resulting print, and does not illustrate cursors.

Cedric Bastiaans, Los Angeles, CA

CASH REGISTER--8K/16K

Cash Register lets your ZX/TS act like a cash register record keeper for a small retail store. It records sales to each customer by item number, price, tax (if any) and price plus tax for each item. It shows each customer's subtotal and gives end-of-day totals.

Enter the tax rate for your area, each item's price, whether it is taxable and the flag to go to subtotal. After each customer answer Y/N to go to another customer or to ending totals. At line 65, enter Cl if using a TS printer to get printed output as well.

This program rounds all figures to two decimal places. I used Ø as a flag because you likely won't find it as a price. If you must use Ø as a price, change lines 85 and 1ØØ to -1. The program requests Y/N to taxable or not.

For a fixed tax rate, delete lines 2Ø and 25 and change line 92 to LET T=tax rate in decimal form.

REM statements list the variables used; delete them if you wish to save memory.

Record up to 5Ø customers with Cash Register as written. With more memory, increase the higher numbers in line 9Ø and 19Ø.

If you won't use a printer, delete lines 63-65, 73, 88, 166, 176, 181, 211, 251-254, 311, 341, 361 and 37Ø.

Arthur Field, Holden, MA

```
   1 REM NAME "CASH REG."
   2 REM BY**ARTHUR FIELD,PUTNAM
RD.,HOLDEN, MA.01520
   6 REM **C=CUSTOMER
   7 REM **I=ITEM
   8 REM **I1=(SUB-TOTAL ITEM)
   9 REM **P=PRICE
  10 REM **P1=(SUB-TOTAL PRICE)
  11 REM **P2=(END-OF-DAY TOTAL
PRICE
  12 REM **T=TAX
  13 REM **T1=(SUB-TOTAL TAX)
  14 REM **T1=(END-OF-DAY TOTAL
TAX
  15 REM **TS=TAX RATE YOU ENTER
  16 REM **C$=INPUT TP INDICATE
USE OF PRINTER
```

```
   17 REM **C1=INPUT FOR C$ TO KE
Y   LPRINT STATEMENTS
   20 PRINT "<ENTER> TAX RATE FOR
 YOUR STATE OR CITY"
   25 INPUT T5
   35 LET I1=0
   40 LET C=0
   45 LET I=0
   50 LET P1=0
   55 LET P2=0
   60 LET T1=0
   61 LET T2=0
   62 LET T2=0
   63 CLS
   64 PRINT "IF YOU WISH PRINT-OU
T   FOR CUST. <ENTER>C1"
   65 INPUT C$
   66 CLS
   71 LET C=C+1
   72 PRINT "CUSTOMER:";C
   73 IF C$="C1" THEN LPRINT "CUS
TOMER:";C
   75 PRINT "ENTER PRICE"
   80 PRINT "ENTER TAXABLE? Y/N"
   85 PRINT "ENTER FLAG 0 AFTER L
AST ITEM"
   87 PRINT TAB 1;"ITEM";TAB 6;"P
RICE";TAB 14;"TAX";TAB 20;"PRICE
+TAX"
   88 IF C$="C1" THEN LPRINT TAB'
1;"ITEM";TAB 6;"PRICE";TAB 14;"T
AX";TAB 20;"PRICE+TAX"
   90 FOR X=1 TO 50
   92 LET T=T5
   95 INPUT P
  100 IF P=0 THEN GOTO 175
  110 LET P1=P+P1
  120 LET I=I+1
  130 INPUT A$
  140 IF A$="Y" THEN GOTO 160
  150 IF A$="N" THEN GOTO 162
  160 LET T1=P*T+T1
  161 GOTO 165
  162 LET T=0
  165 PRINT TAB 1;I;TAB 6;P;TAB 1
4;INT ((T*P)*100+.5)/100;TAB 22;
INT ((T*P+P)*100+.5)/100
  166 IF C$="C1" THEN LPRINT TAB
1;I;TAB 6;P;TAB 14;INT ((T*P)*10
0+.5)/100;TAB 22;INT ((T*P+P)*10
0+.5)/100
  170 NEXT X
  175 PRINT "          SUB-TOTAL"
  176 IF C$="C1" THEN LPRINT "
      SUB-TOTAL"
  180 PRINT TAB 1;"ITEM";TAB 6;"P
RICE";TAB 14;"TAX";TAB 22;"PRICE
+TAX"
  181 IF C$="C1" THEN LPRINT TAB
1;"ITEM";TAB 6;"PRICE";TAB 14;"T
AX";TAB 22;"PRICE+TAX"
  190 FOR X=1 TO 50
  210 PRINT TAB 1;I;TAB 6;P1;TAB
14;INT (T1*100+.5)/100;TAB 22;IN
T ((P1+T1)*100+.5)/100
  211 IF C$="C1" THEN LPRINT TAB
1;I;TAB 6;P1;TAB 14;INT (T1*100+
.5)/100;TAB 22;INT ((P1+T1)*100+
.5)/100
  220 PRINT
  230 PRINT
  232 LET I1=I+I1
  235 LET P2=P1+P2
  236 LET T2=T1+T2
  240 PRINT "ENTER ANOTHER CUSTOM
ER? Y/N"
```



```
  242 LET I=0
  245 LET P1=0
  247 LET T1=0
  250 INPUT B$
  251 IF B$="Y" THEN LPRINT
  252 IF B$="Y" THEN LPRINT
  253 IF B$="Y" THEN LPRINT
  254 IF B$="Y" THEN LPRINT
  260 IF B$="Y" THEN GOTO 66
  270 IF B$="N" THEN GOTO 290
  280 NEXT X
  290 CLS
  300 PRINT
  310 PRINT ".....END OF DAY TOT
ALS....."
  311 IF C$="C1" THEN LPRINT "...
...END OF DAY TOTALS....."
  320 PRINT
  330 PRINT
  340 PRINT "CUSTOMERS:";C
  341 IF C$="C1" THEN LPRINT "CUS
TOMERS:";C
  350 PRINT
  360 PRINT TAB 1;"ITEMS";TAB 8;"
PRICE";TAB 15;"TAX";TAB 21;"GRAN
D TOTAL"
  361 IF C$="C1" THEN LPRINT TAB
1;"ITEMS";TAB 8;"PRICE";TAB 15;"
TAX";TAB 21;"GRAND TOTAL"
  370 IF C$="C1" THEN LPRINT TAB
1;I1;TAB 7;P2;TAB 15;INT (T2*100
+.5)/100;TAB 22;INT ((P2+T2)*100
+.5)/100
  371 PRINT TAB 1;I1;TAB 7;P2;TAB
 15;INT (T2*100+.5)/100;TAB 22;I
NT ((P2+T2)*100+.5)/100
SYNTACTIC SUM:  24335, 8K ROM
```

UNJUMBLE WORD GAMES--8K/2K

Our local newspaper carries a scrambled word game. This program helps me unscramble any word.

RUN Unjumble in FAST. Until it fills, the screen blanks. For short words, hit BREAK to see the list. If you see no correct word, press CONT for more combinations. Successive screens take longer. In 2K, you can do at most 5 letters.

C. Inman, Harmony, RI

```
   1 REM UNJUMBLE BY C.INMAN
   2 SLOW
   5 PRINT AT 10,5;"INPUT THE WO
RD TO BE"
   6 PRINT AT 11,9;"UNSCRAMBLED.
"
  10 INPUT A$
  15 FAST
  16 CLS
  20 LET B=LEN A$
  25 DIM C$(200,B)
  30 DIM W$(B)
  40 FOR C=1 TO B
  50 LET W$(C)=A$(C)
  60 NEXT C
  95 LET R$=""
 100 LET R=INT (RND*B)+1
 110 IF W$(R)="/" THEN GOTO 100
 120 LET R$=R$+W$(R)
 130 IF LEN R$=B THEN GOTO 200
 140 LET W$(R)="/"
 150 GOTO 100
 200 GOSUB 300
 210 GOTO 40
 300 LET E=0
 320 LET E=E+1
 330 IF R$=C$(E) THEN RETURN
 340 IF CODE C$(E)<1 THEN LET C$
(E)=R$
 350 IF C$(E)=R$ THEN PRINT C$(E
),
 360 IF C$(E)=R$ THEN RETURN
 370 GOTO 320
SYNTACTIC SUM:  33483, 8K ROM
```

This program isn't fast, but it's persistent. To avoid waiting forever for a new word that didn't exist, I added this routine to count how many words the computer already came up with. With a word of n letters, you can make n! possible combinations. With a five-letter word, for example, 5! means 5*4*3*2*1, or 120.--AZ

```
   7 LET S=0
 355 IF C$(E)=R$ THEN LET S=S+1
 357 IF C$(E)=R$ THEN PRINT S
NEW SYNTACTIC SUM:  36919
```

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